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Naval Force Protection in the Littorals

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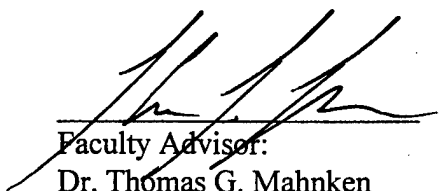
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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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Naval force protection must consider the challenges associated with naval operations in confined waters. Increased risk must be managed as maneuver space is restricted and time to react to an adversary's actions is significantly reduced. Forms of power projection need to be developed that match force protection capabilities with the threats and reduce the risk to forces operating forward. Any force protection scheme must remain realistic, flexible, and operationally executable. It necessitates achieving information superiority over the enemy, establishing an extended reach capability for delivering fires, and the operational dispersion of naval forces.

The next few years are a critical period for the U.S. Navy as potential adversaries seek to exploit an ever increasing number of military options offered by technological developments. Technology is accelerating the need for JV 2010 doctrine development. It must be designed so that force protection and the manner in which forces are organized achieve a good fit with technology.

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Abstract

NAVAL FORCE PROTECTION IN THE LITTORALS

The U.S. Navy relies heavily upon its ability to operate forward in the littoral regions of the world. Forward-deployed naval forces provide the critical operational connection between peacetime operations and the initial requirements of a developing crisis or major regional contingency. As advanced military technologies become available to existing and potential adversaries, the Navy's ability to maintain freedom of action in these coastal regions will likely become challenged. A force protection scheme for naval operations in the littorals that supports the "full-dimensional protection" concept discussed in Joint Vision 2010 has yet to be developed.

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The next few years are a critical period for the U.S. Navy as potential adversaries seek to exploit an ever increasing number of military options offered by technological developments. Technology is accelerating the need for JV 2010 doctrine development. It must be designed so that force protection and the manner in which forces are organized achieve a good fit with technology.

Introduction:

Since the end of the Cold War, the U.S. Navy has shifted its focus from operating in the open ocean to operating in the coastal regions of the world. Today, the Navy relies heavily upon its ability to operate forward in these littoral areas. Forward-deployed naval forces provide the critical operational connection between peacetime operations and the initial requirements of a developing crisis or major regional contingency.¹ As advanced military technologies become available to existing and potential adversaries, the Navy's ability to maintain freedom of action in these coastal regions will likely become challenged. A force protection scheme for naval operations in the littorals that supports the "full-dimensional protection" concept discussed in Joint Vision 2010 has yet to be developed. Any force protection scheme must support the naval expeditionary warfare mission and be able to integrate with joint forces operating in a specific theater of operations. This essay will identify the various threats associated with the littoral environment and present some possible solutions to those threats. An analysis of force protection will then be presented followed by a proposed naval force protection scheme.

Background:

The U.S. Navy's operational concept has changed dramatically during recent decades. No longer does it seek a decisive fleet engagement or an air-sea battle with an enemy who presents a global threat to the nation's security. In fact, one of the prime features of the Navy's operational environment today is the absence of a peer competitor upon the high seas.² This feature, however, has not necessarily been the driving factor in what has taken naval forces into the littorals. The fundamental shift in mission has been driven by the maritime capabilities necessary to support the forward presence and crisis response missions articulated in the U.S. National Security Strategy (NSS).³ These missions are further developed in the National Military Strategy

(NMS), which describes the need to shape the peacetime environment through the use of forward deployed forces. The NMS specifies presence and power projection as two of the strategic concepts intended to shape the peacetime environment.⁴ These strategic concepts provide the basis for the Navy mission and the requirement to operate its forces forward.

The mission of the Navy will continue to be focused on operating in and from the littorals. The reduction of U.S. military installations around the world increases the importance of the Navy's ability to project power from the sea. Deploying naval forces forward is central to peacetime engagement, deterrence and conflict prevention. Effective performance of these functions relies on the fundamental ability to operate in international waters independent of political constraints. In addition to their deterrence value, a key operational advantage of deploying forces forward is the capability to respond quickly to regional conflict and fight and win early. Initial operations by naval forces are also critical to the insertion of follow-on forces into the theater and enabling the joint campaign.⁵ To preserve this capability, naval forces must maintain unimpeded freedom of action in the coastal regions of the world.

The Area-Denial Threat:

Threats to naval forces operating forward are not a new phenomenon. Recent examples illuminate the vital necessity of providing force protection when in the vicinity of a coastline in confined waters. The amphibious landing at San Carlos Bay during the Falklands War in 1982 demonstrates the huge risk posed to naval forces when operating in littoral waters.⁶ Operating without air cover, British ships suffered near catastrophic consequences in what became known as "bomb alley." The bombing and strafing by Argentine aircraft resulted in one British ship sunk and four others severely damaged. The submarine threat also reared its ugly head in the Falklands War as one Argentine diesel presented a significant challenge to British ships. In 1987, as USS

Stark patrolled the Arabian Gulf, two Iraqi missiles penetrated the ship's hull, killing several crewmen. Operation Praying Mantis in 1988 illustrated the lethality of mines as USS Samuel B. Roberts was almost blown in half. Mines also disabled USS Tripoli and USS Princeton during Operation Desert Storm in 1991. These threats have long existed and the Navy has been fortunate that only a few of its platforms have taken hits while operating forward.

The serious dangers posed to naval forces today come in the form of strategies and technologies that an adversary may employ in an attempt to match the capabilities of the U.S. The most threatening among these are weapons of mass destruction, precision-guided munitions and unconventional warfare.⁷ The Theater Ballistic Missile (TBM) threat is a danger to our forces overseas and to our potential allies. Currently, over twenty-five nations have or are developing nuclear, chemical, and biological weapons as weapons of mass destruction (WMD). Over thirty nations have ballistic missiles in their arsenals with hundreds of launchers. The technology is widely available and will likely be used in future wars. The Iraqis have already provided the precedent by their use of chemical warheads during the Iran-Iraq War and the use of SCUD missiles during Operation Desert Storm. In the immediate future, the U.S. is likely to face terrorist or rogue regimes armed with ballistic missiles tipped with WMD.⁸ This type of capability threatens the very deployability of not only naval forces but ground forces and additional land-based air assets as well.

Other current technologies also present a threat to naval forces operating forward. The relatively unconstrained international arms market makes the availability and diffusion of stealth, precision, and information technology a great opportunity to potential adversaries. These same technologies utilized by the U.S. military allow adversaries to pose a credible threat to naval power projection.⁹ Precision-guided munitions are not a one-sided affair for today's Navy as

proliferation of these technologies has become a significant problem.¹⁰ An opponent does not need a stealth aircraft or command of the sky to deliver precision-guided weapons. Small cruise missiles flying at low-level will likely penetrate air defenses and pose a significant threat to naval platforms.

The past several years have witnessed significant increases in satellite bandwidth available to afloat platforms through the use of leased commercial satellites.¹¹ This same commercial capability is also available to those adversaries who are able to exploit it. The current era of space technology is similarity characterized by steady progress among other space-faring nations including China, Russia, and India. The relative advantage of the U.S. in exploiting space is dissipating as these technologies proliferate and are absorbed by foreign militaries.¹²

Unconventional warfare also poses a threat to naval forces operating forward. The weaker adversary will attempt to exploit naval vulnerabilities through a range of asymmetric approaches. Such a strategy would be more oriented toward actions intended to delay, deny, disrupt, and demoralize (D4 operations) naval forces. This threat is comparable to guerrilla insurgency operations on land. Instead of attacking head-on, such an adversary will avoid pitched battle and look for opportunities to ambush, inflict casualties upon, or embarrass U.S. forces.¹³ For the adversary employing this strategy, only one or a few successes equates to victory. This strategy would be aimed at incapacitating naval vessels through the use of mines, submarines, or suicide-type missions. D4 operations increase the degree of friction and risk to naval forces operating in the littorals. They are extremely unpredictable and difficult to defend against.

Current and future adversaries will continue to look for any means available to threaten naval forces operating forward. They will strive to target concentrations of troops and material ashore and attack forces both at sea and in the air. Each of the threats presented has the ability to

restrict naval freedom of action in the littorals and the ability of naval forces to project power from the sea. They are more than a sea-denial threat or Navy problem, though. They are an area-denial threat whose defeat and negation will become the most crucial element in projecting and sustaining U.S. military power where it is needed.¹⁴ What this means for the Navy is really an old equation of sea-denial versus sea-control, but in the much more challenging environment of littoral waters.

Possible Solutions:

Solutions to the area-denial threat must provide a defensive capability with both the ability to provide naval force protection in peacetime through crisis response, as well as the ability to expand that coverage into a full-dimensional joint force protection capability. The prerequisite of forward naval presence is critical to the effectiveness of any solution, whether it be an operational concept, an innovation of technology, or a combination of both. Solutions to the area-denial threat must have an inherent deterrent quality as well as the ability to influence the will of an adversary when deterrence fails. Having considered several area-denial threats, force protection initiatives must address each specifically to include theater ballistic missiles, low-level anti-ship cruise missiles, and D4 operations.¹⁵

Theater Ballistic Missile Defense (TBMD) is one solution that offers the capability to defend forward deployed elements of U.S. armed forces, as well as coalition forces overseas. A TBMD capability is one of the overarching objectives outlined in the NSS intended to meet the threat posed by TBMs.¹⁶ The Navy's forward presence mission complements this objective. Navy ships will either be present or arrive on the scene early and can sustain themselves for days. They provide great operational flexibility as the U.S. continues to withdraw from overseas bases. Desert Storm illustrated the need for a TBMD capability when deterrence fails.

Although not yet operational, TBMD will provide theater Commander-in-Chiefs (CINCs) a deterrent and warfighting capability independent from foreign sovereignty and overseas bases. In the early days of a crisis, naval forces could dramatically ease the threat to airlift and sealift while protecting ports and airfields critical to the buildup of U.S. and allied capability.¹⁷ The ability to defend specific naval units at sea is embedded in the TBMD platform design. Along with the evolving TBMD role, Aegis ships already provide the necessary air surveillance and air control, maritime interdiction, and can project power ashore with cruise missiles and long-range guns.

Another essential capability to combat the area-denial threat is the achievement of battlespace dominance through information superiority. Information superiority provides the backbone for force protection. Embedded in this concept is the capability to collect, process, and distribute uninterrupted flows of information while exploiting or denying an enemy's ability to do the same.¹⁸ The ability to process information has the potential to reach unprecedented levels in the near future. The capacity of high-data-rate satellites will soon offer "bandwidth on demand" allowing unlimited amounts of information to be exchanged real-time between positions anywhere in the world. This prospect offers a technological capability to fully integrate several operational networks of widely dispersed sensors, weapons, and platforms that will effectively function as a single combat unit.¹⁹ Networked information grids increase the velocity of information flow connecting sensors with precision-guided weapons. Battlespace awareness is greatly increased enhancing the synchronization of military operations.

Networking information also enables a cooperative engagement capability (CEC) necessary for defense against low-level anti-ship cruise missiles. Targets detected by one platform or sensor can be engaged by other geographically distant platforms through the sharing of data. A

Common Operational Picture is a wider version of CEC in which all echelons of command are observing and evaluating the same data.²⁰ Increasing near real-time knowledge of the battlespace for war fighters at every level of military activity significantly increases the combat effectiveness of the force. Network-centric technologies that enable the integrated management of battlespace information offer a credible solution to, not only the anti-ship cruise missile threat, but an eventual capability to defend forces from salvo TBM launches.

TBMD and information superiority are obviously not a panacea for all the threats present in the littoral environment. They do not address those D4 threats that fail to get inputted into an information network. Solutions to countering an adversary's D4 operations are aimed at merely reducing the level of risk to naval forces. They can be countered using intelligence assets and by the prudent placement of naval units. Combating mines and submarines in the littorals is a challenging and lengthy process, but the ability of naval forces to detect these threats relies heavily upon the prerequisite of operating ships forward without the concern of cruise missile attack.

Force Protection Analysis:

Risk Management. Positioning naval forces forward in coastal regions significantly changes the operating environment. Force protection becomes a much more difficult operational function. The factors of space and time change considerably. Maneuver space is restricted when operating in confined waters or near a coastline. Time to react in response to an enemy's actions is greatly reduced. This relationship between restricted maneuvering space and time to react favors the enemy and increases the level of risk to forces at sea. Risk is then further increased when transitioning to the amphibious phase of an operation as time and space are compressed to such a degree that ships are extremely vulnerable to cruise missiles.

Capabilities developed to deny access into a littoral theater could make traditional power projection very risky. Surface naval forces, conventional air entry, large ground formations, and operations tied to fixed bases could be rendered ineffective.²¹ The discussed littoral threats to naval forces, specifically mines, sea-skimming missiles, and TBMs already tax the capability of current weapon systems.²² For naval commanders, this presents a complex challenge of risk assessment and risk management. Commanders will have to learn to manage much greater levels of operational and tactical uncertainty.

Factor Space. Forms of power projection need to be developed that match force protection capabilities with the threats and reduce the risk to forces operating forward. With out-of-area support increasingly influencing the outcome of in-theater operations, geographically-oriented theaters could lose much of their strategic autonomy.²³ The area-denial threat diminishes the ability to provide this out-of-area support, the ability of naval forces to protect interests in theater, and raises the cost of intervention. The enemy needs only to raise the perceived level of risk to U.S. combatants deterring high-value units (HVUs) from entering harm's way, negating the deterrence effect of power projection.²⁴

A naval expeditionary force posture relies upon its HVUs to get the ground force ashore in a theater of operations rapidly and safely. This effort often relies heavily upon prepositioned equipment, and in-theater ports, airfields, depots, and command and control facilities. The possibility of saturation TBM strikes requires that the number of these locations be kept minimal.²⁵ Naval operations in this context insist that force protection be inherently a joint function. It is more than implied that naval force protection capabilities extend well beyond the guardianship of its own units and into the entire theater. The naval capability must provide coverage for joint and coalition forces as well. The sea-control capability must merge seamlessly

from the start of a crisis into full control of the littoral region and then be able to fully integrate naval capabilities into the ensuing land battle.

Factor Time. The littoral region, characterized by confined and congested water and air space, is occupied by friends, adversaries, and neutrals alike. Unit identification and appropriate response are complex tasks for commanders. Such was the case in 1988 when USS Vincennes fired missiles against a perceived hostile target that was, in fact, an Iranian airbus. The commanding officer's decision to fire was influenced, not only by heightened tensions because of the recent Iraqi Mirage attack on USS Stark, but also the failure of the airbus to verbally identify itself. This encounter illustrates the enormous challenge of to what degree a commander trusts his weapons systems and information available to him and then to what degree he applies his "good judgment." Had the aircraft been hostile and inflicted damage on Vincennes, the commanding officer would probably have been relieved. This example illustrates the complexity of the space-time relationship and the influence that technology can have in the decision making process.

Commanders must have the ability to radically accelerate their decision making response cycles in all functions of warfare, or run the risk of being outmaneuvered, frustrated, and defeated by the enemy.²⁶ Network-centric technologies have the potential to offer this capability and increase "speed of command" significantly. Integrated information and netted sensors allow the use of surveillance data to be disseminated among all forces in the theater enabling targeting and strike capability from a variety of land, sea, and air platforms.²⁷ Possessing this degree of battlespace fidelity, the decision for a commander then becomes at what point in the information hierarchy does he want to insert his judgment.

One drawback of incessant near real-time battlespace information is, of course, the inability to effectively manage it. To be of use, both data and information must be converted to

knowledge through the process of cognition by which war fighters add relevance and meaning through analysis and evaluation. Although technology has become critical to this process, human cognition remains a critical function in determining any course of action.²⁸ It is from the element of cognition that a commander derives his "good judgment" and technology will never be a panacea for battlefield decision making. A serious danger can arise from an over reliance on seemingly effortless technological superiority. Those who need to make quick decisions under conditions of uncertainty and stress might become overconfident and presumptuous. Alternately, however, the achievement of unlimited bandwidth capacities may also represent the final confirmation that the ability of machines to manipulate and automate data far exceeds individual human capacity to decipher and act on that information.

Proposed Force Protection Scheme:

Any force protection scheme should exploit existing U.S. advantages of satellite and airborne intelligence, information management, and the ability of navigation and sensor systems to guide precision munitions. Most importantly, it must remain realistic, flexible, and operationally executable. It must include an early and continuous assessment of an adversary's area-denial capability and the ability to respond to a spectrum of threats. This necessitates achieving *information superiority* over the enemy, establishing an *extended reach* capability for delivering naval fires, and the *operational dispersion* of naval forces.

Information Superiority. Network-centric operations can deliver to the Navy the powerful dynamic of situational awareness which can then be translated into competitive advantage. Exploited situational awareness is effectively converted into increased combat power.²⁹ The rapid processing of battlefield information gives naval forces the ability to react faster to the TBM and anti-ship cruise missile threat. This network-centric style of warfare has

the potential to compress and even eliminate decision making time delays. Speed of command can be accelerated by orders of magnitude. Common information can be shared by all users and providers. Targets can automatically be deconflicted and paired with ordnance.

Integrating networks of information forms a plug-and-play type of architecture that would allow, not only naval units, but also joint forces to synchronize operations as they flow into theater. The integration of data networks will allow each ship's fire control system to become a decision maker. This common C4ISR backbone would enable the unrestricted flow of near real-time information among units and a seamless transition from the defense to the offense.³⁰ A network-centric capability can deliver the battlespace awareness that is central to force protection. It allows for freedom of action on the seas and makes possible simultaneous offensive operations.

Some argue that to substitute technology for conventional military capabilities reflects a peculiar faith in science's ability to engineer simple solutions to complex human problems.³¹ Too many critical pieces of information remain inaccessible to sensors and beyond the power of computers and war fighters are limited in both what they can absorb and what they can pass along. Nevertheless, it still makes as much sense to integrate information networks and sensors as it does to operate traditionally using common charts. A lack of commonality exists today in the battlefield management of information and data. A practical and viable force protection scheme must integrate all sources of information and data. If the Navy fails to establish information superiority in a littoral theater, it will by default be giving the advantage to the enemy.

Force Dispersion. In naval warfare, the units of force are much smaller than land warfare. An entire aircraft carrier battle group usually consists of only a few warships. Also, as technology has increased the capabilities of naval platforms, fewer ships are necessary to ensure sea control. This increases the value of each unit. Consequently, tactical error leading to the disabling of one

or two warships would destroy a substantial portion of the total force available.

The operational dispersion of naval forces can significantly increase their survivability in the confines of littoral waters. This may necessitate increased standoff ranges from an adversary's coastline in order to reduce risk to some acceptable level. The geographic dispersion of platforms denies lucrative targets to an enemy's long-range strike systems.³² Whether the force is broadly scattered off a coastline or in bounded seas, this reduces an adversary's interdiction capabilities and allows the force to effectively manage the D4 threat. Networked platforms enable force dispersion without degradation of battlespace awareness or weapon systems performance.

The intent of force dispersion is to reduce the risk to naval platforms, reduce the enemy's situational awareness, and compel the dispersion of his forces. Because battlespace information is networked among platforms, their location allows the enemy no indication from where or in what direction naval fires will be directed. Force dispersion also enables naval units to manipulate the geometry of the operating area. It can be expanded or contracted based on the threat axis and makes deception measures effective through the use of unnecessary maneuver. Deception measures become essential when transitioning to the amphibious phase of an operation and landing the Marines ashore. Battlespace awareness and information superiority are both important prerequisites to maneuvering the fleet toward an enemy's coastline where risk is significantly increased.

A weakness of the force dispersion concept may be that it fulfills to a lesser degree the mission of deterrence. Having modified the space-force relationship by repositioning the fleet, these ships are much less visible during periods of crisis. This consideration cannot be ignored, however, it is difficult to find quantifiable proof that visible forward presence equals deterrence. As new technologies become available to adversaries, the silhouettes of U.S. Navy ships on the

horizon will become less proportional to the measure of deterrence they provide. Most of their deterrent effect is provided by extensive worldwide media coverage focusing on the general location of U.S. naval vessels off an adversary's coastline. This effect is not diminished by merely dispersing the fleet for its safety. Forward naval presence may actually provoke an undesired reaction from an adversary. Dispersing ships provides a less obtrusive and less provoking naval posture while concurrently meeting the NSS objective of forward presence.

Extended Reach. The ability of naval forces to deliver precision ordnance on target from extended ranges is critical to the defense of all forces operating in a littoral theater. Protection of naval forces is embedded in the extended reach concept. Airfields and ports can be rendered useless early in a conflict negating their potential influence on events at sea. An adversary can be engaged with precision-guided missiles well before his forces become a threat to naval platforms. The capability of delivering accurate fires inland also contributes to force protection indirectly by providing an inherent quality of deterrence. Should deterrence fail though, naval forces must possess the capability to decisively influence events at sea and ashore. Sea, air control, and force protection become integrated functions as each platform's weapon system becomes responsible for defensive measures well beyond their own self-protection. Forces ashore separated by hundreds of miles will rely upon Navy ships to provide force protection from initial insertion to well into the land battle. The ability to accurately strike deep within an enemy's territory from Navy ships will be decisive in determining the outcome of a regional crisis.

TBMD is an extended reach capability that is essential to responding to attacks of WMD. Dispersed and networked platforms will receive early indication of TBM launches and configured platforms can respond accordingly. This capability will offer protection for all U.S. forces deployed to a crisis area. It provides the first layer of defense-in-depth for friendly forces and

reassures threatened coalition allies. TBMD will allow for the reinforcement of deployed forces by protecting debarkation ports, airfields and staging areas. This capability will provide cover ashore during forcible entry by Marines or other expeditionary forces.³³ TBMD is also central to the deterrence mission, but should that fail, the ability to respond is absolutely critical to preventing the catastrophic loss of life, host-country infrastructure and military equipment.

The extended operational reach offered by TBMD presents some complex challenges. It elevates the importance of Aegis configured platforms with the possibility of even making them national strategic assets. Their role, positioning, and protection becomes as vital as that of the aircraft carrier. Another challenge is that a missile launch in response to a hostile TBM will probably require firing over an adversary's sovereign airspace. Rules of Engagement for this scenario have to be relatively permissive. Another challenge is threat differentiation. Platform weapon systems must be able to discern which missile is hostile and which is the response, even as it passes overhead at hypersonic speed. TBMD will also need to integrate with Army and Air Force missile defense systems. These challenges all illuminate the need for an overarching joint force protection scheme that addresses the complexities of a TBMD capability.

Conclusions and Recommendations:

The preceding littoral analysis and proposed naval force protection scheme is offered in support of the full-dimensional protection concept described in Joint Vision 2010. The scheme is designed to match capabilities that are currently being developed, and will likely become available within the next five years, with the area-denial threat. The scheme does make the assumption that these emerging technologies will perform as advertised. There are some obvious tradeoffs that are made within the recommended scheme. Standoffs associated with force dispersion will reduce sortie generation rates aboard the carrier decks. The insertion of expeditionary Marine forces

ashore will require an even more careful planning and risk assessment process. The effectiveness of deterrence through visible naval presence may be diminished. A weakness in the overall scheme is the over reliance on and underdevelopment of sensor technologies. Effective sensors, whether satellite, airborne, or seaborne, are central to a networked force. The scheme is also heavily reliant upon information processing capability. Information systems development implies that a real challenge ahead is how to organize people around these systems to fully exploit their capabilities.³⁴ One recommendation is to reorganize the operational level intelligence bureaucracies among the services to support both the mission and force protection.

Technology is accelerating the need for Joint Vision 2010 doctrine development. It must be designed so that force protection and the manner in which forces are organized achieve a good fit with technology.³⁵ Joint operations doctrine must embrace all aspects of force protection and focus it at the operational level, the theater CINC.³⁶ There is no reference in Joint Publications 2-0, 3-0, 3.07 or Naval Doctrine Publication 1 to force protection as a separate principle, only minor references to protection of forces in various subject areas.

The littorals will continue to be an increasingly hostile environment to naval forces. The next few years are a critical period for the U.S. Navy as potential adversaries seek to exploit an ever increasing number of military options offered by technological developments. These potential capabilities could significantly limit the freedom of action for naval forces in the littorals.³⁷ Obviously, there are threats in this environment that computers cannot solve, but technology is progressing at such a rate that its insertion into operational concepts must be addressed today.

Endnotes

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²¹ Michael G. Vickers, Warfare in 2020: A Primer (Washington: Center for Strategic and Budgetary Assessments, October 1996), ii.

²² Navy Department, "...From the Sea" (Washington: 1992), 8.

²³ Vickers, 2.

²⁴ Mahnken, 38. High-value units (HVUs) in Navy Battle Groups have traditionally been the aircraft carrier. The term is also used to address the large assault ships, helicopter carriers and dock transports, in the Amphibious Ready Group. Force protection efforts place significant emphasis on the guardianship of these vessels.

²⁵ Paul Van Riper and Robert H. Scales, Jr., "Preparing for War in the 21st Century," Parameters, Autumn 1997, 13.

²⁶ Paul J. Reason and David G. Freymann, Sailing New Seas, Newport Paper, no. 13 (Newport: U.S. Navy War College, 1997), I-3.

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²⁸ Mackubin T. Owens, "Technology, the RMA, and Future War," A John M. Olin lecture on National Security and Defense Studies, U.S. Air Force Academy, Colorado Springs, CO: 30 October 1997.

²⁹ Arthur K. Cebrowski and John J. Garstka, "Network-Centric Warfare...Its Origin and Future," U.S. Naval Institute Proceedings, January 1998, 33-34.

³⁰ The acronym C4ISR represents combined command, control, communications, computers, intelligence, surveillance, and reconnaissance capabilities.

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³⁴ FitzSimonds, "The Cultural Challenge of Information Technology," 10.

³⁵ Thomas G. Mahnken and Barry O. Watts, "What the Gulf War Can (and Cannot) Tell Us About the Future of Warfare," International Security, Fall 1997, 161.

³⁶ Douglas R. Cochran, "Force Protection Doctrine: An Operational Necessity," (Unpublished Research Paper, U.S. Naval War College, Newport, RI: 18 May 1998), 13.

³⁷ James R. FitzSimonds, U.S. Intelligence at the Crossroads (Washington: Brassey's 1995), 277.

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